

Chapter 39

CITES, corals and customs: The international trade in wild coral

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ABSTRACT

The international trade in live Scleractinian corals as 'marine ornamentals' is a global industry responsible for the movement of huge numbers of animals every year. An analysis of the CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) trade database shows well over a million colonies traded in 2005, the year for which there is most recent data. The major importers are the United States (US) and the European Union (EU) accounting for 65 % and 24 % of the total annual imports of hard corals respectively. The biggest exporter by far is Indonesia, which accounted for 91 % of exports made in 2005.

Legislative mechanisms such as CITES and the EU Wildlife Trade Regulations provide a framework for monitoring and regulating the trade, but despite these restrictions substantial numbers of corals (all listed on CITES Appendix II) are still imported illegally every year. Customs teams work at national borders to prevent such shipments and with support from public aquariums can have an impact on the illegal trade. A partnership in the United Kingdom (UK) between HM (Her Majesty's) Customs and the Zoological Society of London (ZSL) has seized and re-housed 1000 colonies of hard coral brought into the UK illegally between 2003 and 2007 and contributes to the enforcement of CITES regulations on the ground. Public aquariums have a valuable role to play in supporting CITES legislation and in educating the general public about the need for sustainability in the marine ornamental trade.

INTRODUCTION

The threats posed to coral reefs by the activities of a growing human population are many and varied (Hodgson, 1999; Spalding *et al.*, 2001; Burke *et al.*, 2002). The impacts and pressures they face are so diverse and complex, and their outcomes so interdependent and unpredictable that they can often be extremely difficult to accurately quantify. One exception should be the role that the commercial trade in wild animals plays in the long-term persistence of populations *in-situ*. At a time when there are so many anthropogenic impacts on reef habitats; the species they support, and the people that rely on them for survival, the onus is on those involved at all levels of this trade to ensure that it is sustainable in the long term. It should be perceived as a very real tragedy that the threat status of any one species should be increased further because of its attractiveness as a consumable 'ornamental' item.

Although there are many limitations to a complete understanding of the level and scope of trade in any one group of animals (especially one as taxonomically diverse as Scleractinian corals), there is a good opportunity to use the well-established commercial structure between nations as a basis for at least monitoring our impacts through this mechanism. International legislation such as the Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES) (www1) provides a means to both monitor and regulate the enormous volume of trade in wild species. Through the system of listing species on three different appendices, it not only records and analyses the legal trade in species, it also provides a mechanism for restricting trade in species deemed too vulnerable to withstand exploitation of this kind. It forms the basis for national legislation that

can fine, confiscate and ultimately prosecute those involved in illegal trade.

The majority of the wild collected live corals in the trade are destined for hobbyist tanks in private homes but many public aquariums that exhibit coral species also acquire at least some of their collection from the wild. The paper will review the practical obligations that are placed on any organisation importing wild-collected corals.

Trade legislation and enforcement

There are a wide variety of legal tools regulating the trade as it pertains to coral. This paper cannot provide an exhaustive review but explains the main legislative structures and gives a couple of national examples for illustration.

CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (www1) came into force in 1975. 171 countries are signatories to the convention and are known as 'parties'. There are three categories (Appendices) that species in trade can be listed under (Table 1). In total it now lists more than 30,000 species under Appendix II including more than 2,000 species of hard coral. A further genus (*Corallium* sp.) was proposed by the US for inclusion on Appendix II at 2007's Annual Conference of the Parties (Netherlands June 2007) although this proposal was later rejected. All coral species in CITES are Appendix II which permits regulated trade provided:

- a) The exporting country is sure the export will not be detrimental to the survival of the species,
- b) The specimens have been legally obtained,
- c) Welfare guidelines will be observed during handling and shipping

In addition to wild-collected corals, since 1991 CITES has given consideration to other methods of production such as aquaculture and ranching, that is the in or ex-situ grow-out of asexually produced colonies. However there are problems inherent in distinguishing between the different origins of a coral colony, this will be considered further in the section on limitations to the legislation.

Table 2: CITES Source Codes in relation to coral production system

W	Wild, maricultured, or farmed corals
F	Aquacultured corals (first-generation cultured corals that are produced in open systems)
C	Captive-bred corals or captive-cultured corals (second-generation cultured corals that are produced in closed system)
R	Ranched corals

EC 338/97

The EU Wildlife Trade Regulation (EC 338/97) supplements CITES legislation for the 27 countries that make up the single European Union. Regulation EC 338/97 enables the European Commission to establish import restrictions with regard to certain species/countries (Table 3). Rather than the exporting country being responsible for ensuring the non-detriment of the export, the importing country raises a concern about a species and the EU Scientific Review Group investigate further. If a non-detriment finding is made, the Scientific Review Group forms a Positive Opinion and imports can be resumed. If the initial concern is confirmed, the Scientific Review Group forms a Negative Opinion and imports are banned

Table 1: Summary of the different appendices of CITES

Appendix I	Most threatened species	Trade effectively banned with few scientific exceptions	About 1,000 species
Appendix II	Species threatened or might become threatened by international trade	Trade regulated for sustainability	More than 30,000 species
Appendix III	Species threatened only in parts of range	Used by countries seeking international assistance regulating trade in species of national concern	About 300 species

Table 3: Species currently banned from import to EU (under WTR EC 338/97)

Exporting country	Species banned under WTR EC338/97
Indonesia (except maricultured specimens)	<i>Euphyllia cristata</i> (Chevalier 1971)
Indonesia (except maricultured specimens)	<i>Euphyllia divisa</i> (Veron and Pichon 1980)
Indonesia (except maricultured specimens)	<i>Euphyllia fimbriata</i> (unknown)
Indonesia (except maricultured specimens)	<i>Euphyllia picteti</i> (unknown)
Indonesia (except maricultured specimens)	<i>Scolymia vitensis</i> (Bruggeman 1877)
Tonga	<i>Acanthastrea</i> sp. (Milne, Edwards and Haime 1848)
Tonga	<i>Cynarina lacrymalis</i> (Milne, Edwards and Haime 1848)
Tonga	<i>Favites halicora</i> (Ehrenberg 1834)
Tonga	<i>Platygyra sinensis</i> (Milne, Edwards and Haime 1848)
Tonga	<i>Plerogyra sinuosa</i> (Dana 1846)
Tonga	<i>Scolymia vitensis</i>
Fiji	<i>Blastomussa wellsi</i> (Wijsman-Best 1973)
Fiji	<i>Plerogyra simplex</i> (Rehberg 1892)
Fiji	<i>Trachyphyllia geoffroyi</i> (Audouin 1826)
Haiti	<i>Agaricia agaricites</i> (Linnaeus 1758)
Solomon Islands	<i>Heliopora coerulea</i> (Pallas)
Solomon Islands	<i>Catalyphyllia jardenei</i> (Saville-Kent 1893)

into all 25 member states. The opinions are reviewed regularly and new information is included on biology or trade that may affect the import suspension. The suspensions can be implemented and lifted quickly in response to new data.

US - Endangered Species Act

In the US the following species are listed under the Endangered Species Act, making trade in them subject to close monitoring:

- *Acropora palmata* (Lamarck 1816) (T)
- *Acropora cervicornis* (Lamarck 1816) (T)
- *Montipora dilatata* (Studer 1901) (S)

UK - COTES

In the UK further powers to enforce controls are contained in The Control of Trade in Endangered Species (Enforcement) Regulations 1997 (COTES). Among other things, this gives police certain powers of entry, and the power to obtain samples for DNA analysis.

This paper analyses CITES trade data to give an overview of the international trade in live corals. It also uses a case study from London Zoo Aquarium, Zoological Society of London (ZSL), UK, to describe how customs teams and public aquariums can work together to ensure CITES legislation is fully implemented at national borders.

METHODS

This paper utilised three sources of information to analyse the status of the live trade in corals:

1. The CITES trade database. This is administered by the World Conservation Monitoring Centre (WCMC) in Cambridge, UK, and compiles annual data supplied by all countries party to CITES. Trade figures are submitted to WCMC by national CITES Management Authorities detailing all import, export and re-export figure in CITES listed species for the previous year and are made available for analysis in an on-

1. line format.
2. London Zoo aquarium data on coral seizures received from HM Customs.
3. Data collated from questions submitted to other aquariums on their experiences with Customs seizures of live corals, distributed through aquarium listservers.

The data and analyses are exclusively for the trade in live corals and do not include live rock or trade in dead coral skeletons.

RESULTS

The international trade in live coral

The analyses below have been applied to data from the CITES trade database for the period 2002 - 2005 which are the most recent set of statistics available (Caldwell, pers. com.). The

data analysis only applies to corals that have been recorded in the database by genus and by piece. All those recorded as *Scleractinia* or by weight have been removed as these entries often refer to live rock rather than corals. The figures are based on those reported as imports rather than exports as the latter data more clearly define the number of export permits issued rather than the number if shipments actually made (Caldwell, pers. com.). Wabnitz *et al.* (2003) conducted a thorough review of the same statistics for the period 1997 to 2001 and their findings for that period have been combined with the data from 2002 – 2005 in Figure 1 for comparison.

The overall totals of coral imported dropped steadily from a high of 1,142,242 pieces in 1999 through to 2003. However the most recent two years data show numbers rising steadily again, and breaking the million mark again in 2005.

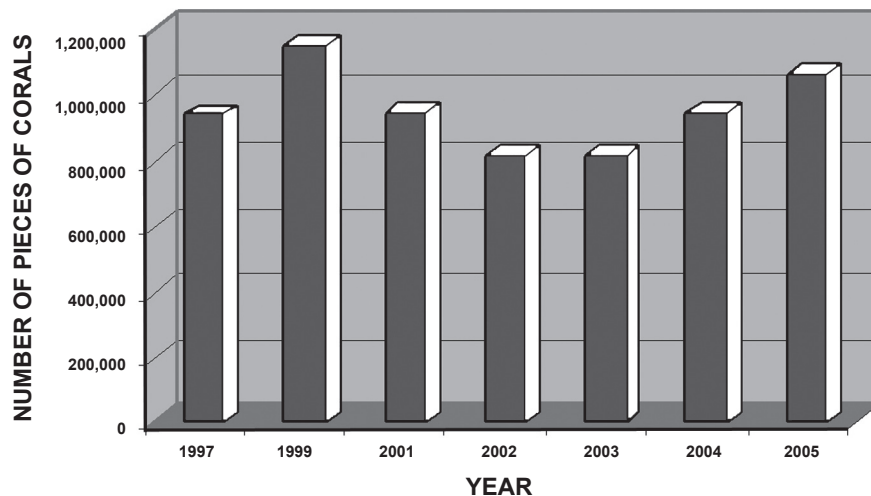


Figure 1: Number of pieces of live coral imported by year (CITES Trade Database)

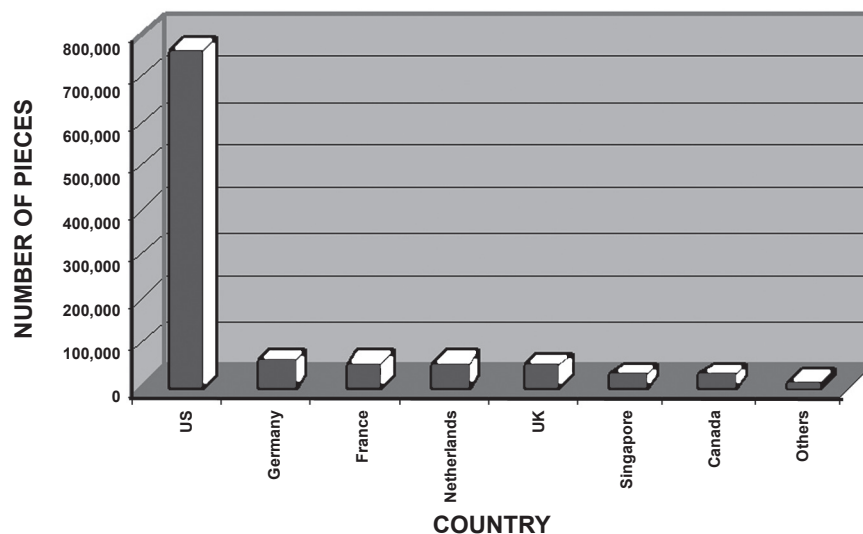


Figure 2: The top countries importing live coral in 2005

Using data from the most recent year available (2005) to examine the major importers and exporters, the main contributors to both remain largely consistent over time (Figure 2).

When the data from EU member states are combined into a single economic unit, the top 6 importers account for 99 % of the total corals imported in 2005 (Figure 3).

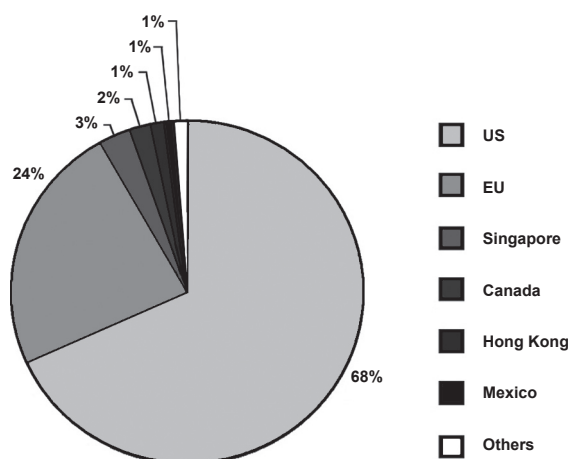


Figure 3: Top six importers as percentage of total import of live corals

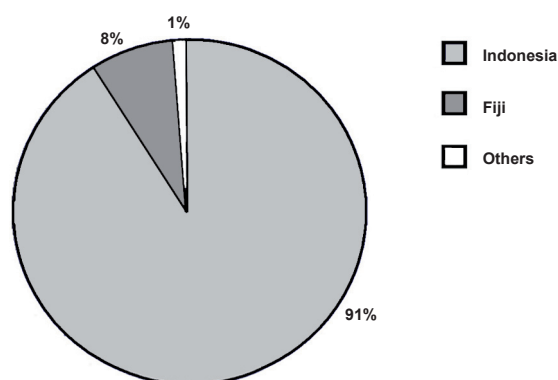


Figure 4: The top countries exporting coral in 2005

The top exporting countries are illustrated in Figure 4, the only big change in 2005 being an increase of 20 % in Indonesia's share of the total from 71 % in 2001 up to 91 % in 2005. The 'others' that share the remaining 1 % of the export market include the Bahamas, the Solomon Islands and Tonga.

The genera most commonly traded internationally; *Acropora* sp. (Table 4) are the most in demand in the trade followed by the large-polyp species.

UK case study – HM Customs and the Zoological Society of London

More than 67 million passengers pass through Heathrow annually, making it the world's busiest

Table 4: The top 10 genera most commonly traded in 2005

Genera	No. of pieces
<i>Acropora</i>	180,128
<i>Euphyllia</i>	116,483
<i>Goniopora</i>	102,513
<i>Trachyphyllia</i>	58,838
<i>Plerogyra</i>	41,014
<i>Montipora</i>	40,326
<i>Heliofungia</i>	40,278
<i>Lobophyllia</i>	35,332
<i>Porites</i>	35,090
<i>Turbinaria</i>	32,087

international airport (with a fifth terminal about to open). HM Customs

and Excise maintain a permanent presence there with a dedicated team of 8 officers making up the CITES team. The airport also has a large Animal Reception Centre, which is equipped to process and house a variety of species that are confiscated or under inspection of some kind. While the animal facilities at Heathrow are better than in most international airports, the particular difficulties associated with holding sensitive aquatic species, received at short notice and often in very large numbers, makes the job of confiscating illegal shipments a very difficult one.

Since 2003, ZSL has worked in partnership with the UK customs authorities, providing support in the identification of corals and in housing confiscated live specimens. In the four years since this partnership began ZSL has received about 1,000 individual hard coral specimens (as well as many hundred soft corals, fish and other invertebrates) as confiscations (Figure 5).

The complex taxonomy of Scleractinian corals makes it hard for customs teams to positively identify species precisely. In most cases, without the help of people trained in coral identification and available at short notice to help, CITES teams may have no choice but to release shipments. In the absence of specialist coral skills, customs agents often have to focus more on paperwork irregularities and mis-matches in quoted numbers rather than the more common problem of misidentified corals. Where CITES teams do have the training and the support they often pick up misidentified species; e.g. several shipments through Heathrow in 2004

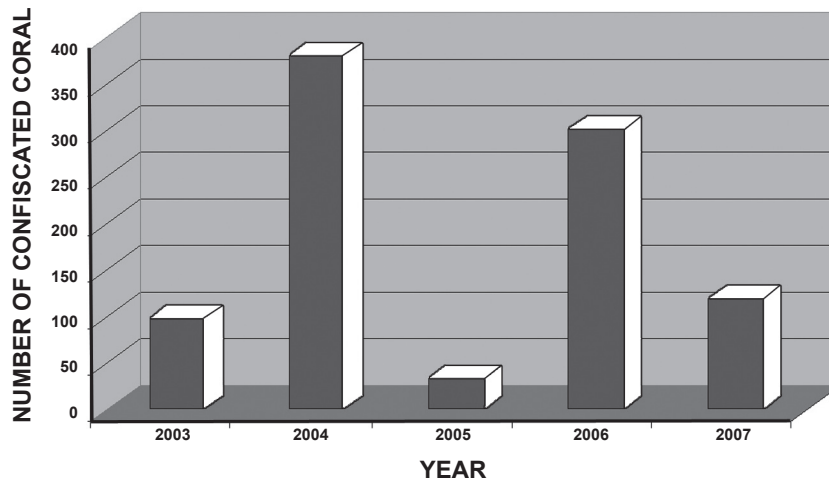


Figure 5: Number of confiscated corals received by ZSL per year

and 2005 had a variety of *Acropora* species listed as *A. hyacinthus* (Dana 1846) while, even to the relatively untrained eye there were clearly more than one species.

The species represented in the confiscations reflect the compositions of global imports, with the following 10 genera accounting for 66 % of the total taken.

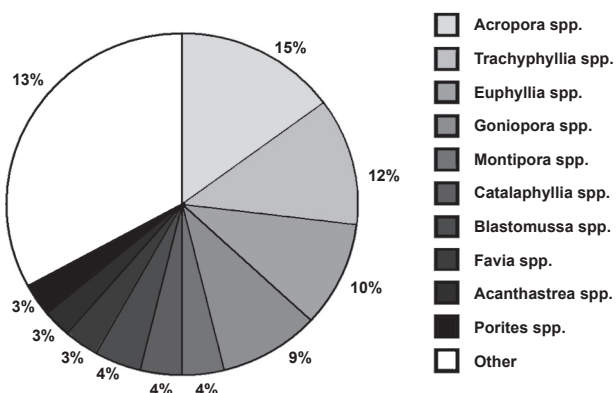


Figure 6: Genus as a percentage of the total number of hard corals received 2003-07

While the confiscations themselves vary greatly in size and composition, what they usually had in common is the poor condition of the corals themselves. For example, having spent several days in transit from Indonesia or Fiji to London, they are then delayed further while paperwork is checked and customs inspections made. By the time they arrive at the aquarium, temperatures in the shipping water may have dropped very low, water quality is often extremely poor, and physical damage from repeated handling of the boxes and bags will claim a large proportion of the colonies through subsequent bacterial infections. The presence of so many specimens

of large-polyp genera (*Euphyllia*, *Catalaphyllia*, *Trachyphyllia*, etc.) causes particular problems. Their fleshy bodies are easily damaged against the sharp skeletons, and they rarely ship well even in ideal conditions.

Housing large confiscations is another problem – it is a challenge to remain permanently equipped with mature quarantine facilities sufficient to house a hundred or more hard coral specimens with only a few hours notice. At the London Zoo aquarium an ancient building and severe limitations to infrastructure make this challenge even more profound. A 4.2 m³ recirculating system of 10 tanks of varying size and depth, with a variety of light combinations between 150 W and 400 W just about provides the flexibility to cope with incoming shipments. Quarantine restrictions cannot be perfect however and it has to be accepted that colonies in the existing collection will be exposed to wild collected stock. Over-crowding in the short term can exacerbate physical damage from the shipping process and compatibility issues need to be resolved quickly. All these issues have to be considered carefully during the long but hectic unpacking process that a large shipment requires. Added to which the confiscations arrive with virtually no warning and usually at the end of the day often requiring staff to stay late into the night acclimating animals.

The confiscated corals remain the property of HM Customs and the skeletons of any that die are cleaned, labelled and retained should they be required for further analysis. Each colony is photographed for future reference and permission must be sought in advance of donating any of them to other public aquariums. The commitment is a large one, in terms of staff time, space in the aquarium and

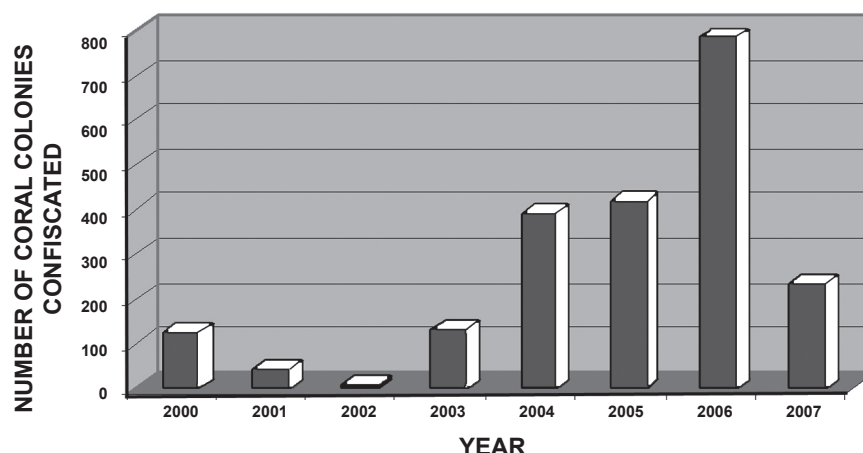


Figure 7: Annual numbers of confiscated corals received by a group of 5 aquariums

veterinary resources. However the fact that the commitment is an open one – with an agreement to take any shipment at any time, means that the customs teams have the support they need to confiscate illegal shipments without further compromising the welfare of the animals.

Other aquariums playing a similar role

A limited survey of other aquariums around the world that also take confiscated shipments confirmed the unpredictability of this undertaking. Most aquariums responded that they had never received customs confiscation 72 % (n = 30), and of the 8 aquariums that had, only 5 were able to provide records of numbers and genus.

Confiscations varied in size from 3 to 461 individuals and the annual totals of the 5 aquariums that shared records show the numbers of confiscated corals received by this

group between 2000 and 2007.

The most common genera represented in confiscated shipments overlap substantially with the top 10 genera most commonly traded in the recent data as shown in Table 5.

DISCUSSION

It is clear from a comparison with trade data from the 1997-2001 period (Wabnitz *et al.*, 2003) that the international trade in live coral, having experienced a slow down from 1999 up to 2003, has been increasing again in recent years. The most recent data available seem to show the trade approaching its former high point in 1999. Data for 2006 will not become fully available until the end of 2007 but it will be interesting to see if this upward trend continues. There is no immediate reason to suspect it will not, as the popularity of marine aquarium keeping continues to increase, supplying a market of around 2 million people worldwide (Green, 2003). The rising figures can be at least partly explained by the increase in the share of the export market taken by Indonesia (from 669,192 pieces of coral exported in 2001 to 1,063,990 in 2005). Indonesia has made significant efforts in recent years to make the monitoring of its export trade more accurate, provide the WCMC with clearer trade figures and to describe management policies to address concerns over fisheries sustainability. However, those concerns remain in relation to certain species as evidenced by the list of negative opinions held by the EU Scientific Review Group. It will be interesting to see what effects proposed legislation to improve sustainability in imports to the US (the world's biggest importer by some

Table 5: Top 10 genera traded vs top 10 genera confiscated in ranked order

Top 10 genera traded 2005	Average top 10 genera confiscated (2000-2007)
<i>Acropora</i>	<i>Trachyphyllia</i>
<i>Euphyllia</i>	<i>Plerogyra</i>
<i>Goniopora</i>	<i>Acropora</i>
<i>Trachyphyllia</i>	<i>Euphyllia</i>
<i>Plerogyra</i>	<i>Caulastrea</i>
<i>Montipora</i>	<i>Goniopora</i>
<i>Heliofungia</i>	<i>Lobophyllia</i>
<i>Lobophyllia</i>	<i>Catalyphyllia</i>
<i>Porites</i>	<i>Blastomussa</i>
<i>Turbinaria</i>	<i>Montipora</i>

way) will have on Indonesia, the world's biggest exporter. These two countries alone have the power to make enormous changes to the trade between them.

There are some shortcomings in the trade data, which should be addressed in a discussion of the results. The WCMC trade study (Wabnitz *et al.*, 2003) had the advantage of access to the Global Marine Aquarium Database, which had trade figures submitted from wholesalers and dealers up to 2003. Unfortunately data has not been submitted to the database since 2003, and this is a great loss when attempting to analyse the trade. The CITES database figures have to be extensively edited before they can be used, and this results in an under-estimation of the size of the trade in the context of an analysis such as this. There is a pressing need to develop a more accurate database of the marine ornamental industry. In its absence it is impossible to be confident about the sustainability or otherwise of any specific fishery. Efforts to resurrect GMAD or a similar tool should be encouraged. (Teleki, pers. com.)

CITES IN OPERATION

CITES import/export/re-export permits are available to download from the Internet (www3) as well as from national CITES Management Authorities (www4). It is important to contact the authority to determine the national requirements as they vary from country to country in some respects. The permits require detailed information on the origin, source, CITES status and purpose of use of specimens. In some exceptional circumstances permits can be issued after specimens have already been shipped but these are rare. Some exemptions to CITES regulations are possible; registered museums and other research facilities may claim exemption when shipping preserved tissue samples, and fees may be waived if imports are for scientific use with a conservation benefit rather than just a commercial use.

One of the conditions for a shipment of coral under CITES is that the transport guidelines should be followed and in particular the Packers Guidelines for aquatic invertebrates (www4). These specify in some detail the advance arrangements for transport that should be made, specify the design of the shipping container and give instructions on labelling and

documentation.

Confiscation of a shipment by CITES management authorities may be made on the following grounds:

- Failure to provide appropriate CITES permits (in line with national requirements)
- Failure to provide full and/or accurate information within those permits (e.g. misidentification of species or declaring wild collected specimens as maricultured).
- Failure to comply with the transport guidelines.

Sanctions vary nationally but, in addition to the confiscation of goods, may include fines and prosecutions leading to prison sentences.

In practice however, the sanctions applied for violations of CITES and the Wildlife Trade Regulations rarely reach the maximums set by law. A 2002 TRAFFIC study reported that they rarely exceed one-quarter of the maximum fine or prison sentence (Anton, 2001).

LIMITATIONS TO THE LEGISLATION

It is clear that there is a variety of different legislation with varying degrees of strictness in operation. However, national variation in how legislation is interpreted can cause problems. In 2005 an EU Wildlife Trade Enforcement Co-ordination Workshop was convened to address this. By talking to customs and CITES officials from the member states it revealed a single economic entity with 25 different ways of interpreting the legislation on the trade in wildlife. They concluded there was a pressing need integrate and to align the import and export procedures between countries.

A concern noted by national customs officials is that strict enforcement of the legislation at one point of entry in one country can, and does, deflect imports to other airports and ports within the same country and ultimately to other countries entirely where enforcement may be weaker (Luffman, pers. com.)

Another concern is that once a colony has been imported (legally or illegally) and traded there is no good mechanism for establishing where it came from. A proposal is currently under consideration that would require CITES listed specimens to be registered – putting the onus on the owner of the specimen to provide documentation to support its legality. This

raises obvious questions about how to reliably identify colonies over time.

A technicality in the exemptions for maricultured corals may also provide a loophole in the legislation. Large pieces of coral may be broken from a parent colony and attached to an artificial base for export rather than the cultivation of a small fragment over time. The CITES animal committee is aware of this weakness. Customs teams are responsible for making decisions on the validity of this description for incoming shipments, which can be extremely difficult on the ground.

As well as the huge amount of legal CITES listed coral coming into the importing countries there is clearly a substantial illegal trade, and many officials in national management authorities believe that it is on the increase (Study on the Enforcement of the EU Wildlife Trade Regulations 2006). A study refers to several sources that consider the illegal wildlife trade is approximately 25 % of the level of legal trade (Fröhlich *et al.*, 2003), though it is obviously very difficult to quantify the ones that get away. Organisations such as TRAFFIC and Project Seahorse routinely conduct surveys on illegal trade in marine species but figures for corals are estimates.

A CONSERVATION ROLE FOR PUBLIC AQUARIUMS

Although close relationships between public aquariums and customs teams are not common, they can be productive partnerships where they are developed. Although confiscations probably account for a fraction of the number of illegal corals successfully brought through national borders, they do have a far-reaching impact. Confiscated shipments present a large economic loss to importers and a potential confiscation is a very real deterrent to those who might seek to test the rules. The close enforcement of CITES at national borders is the only way that accurate data can be collected on the size and shape of the industry. That in turn is vital information when considering the sustainability of the trade in any one species or population.

Where aquariums work closely with customs teams they can provide the support to make this enforcement possible.

There are three main elements to this support:

Identification

Support with identifying corals is vital to the

monitoring of the trade; this is a notoriously difficult task for customs officials who are not coral specialists. The fact that CITES now only requires identification to genus level in many cases has helped. As has the fact that several of the species listed as banned from import under the EU WTR are easily identifiable (*Catalyphyllia* for example) however support with identification is crucial – particularly where evidence needs to be gathered to support a prosecution.

Re-housing

When customs officials are sure that seized corals can be quickly and safely re-homed with no further compromise to their welfare they have a significant advantage in making a decision whether to proceed with a seizure. Delays are reduced and decisions made more quickly. Many of the confiscated corals will arrive dead or in very poor condition and although processing each group is time and resource consuming on the part of the aquarium, it is important that the commitment is open-ended if it is going to work effectively as an enforcement tool.

Conservation education

Public aquariums have a clear remit in the field of conservation education, and even if they are not in a position to exhibit customs confiscated corals, they can still make a significant contribution to public understanding of these issues.

An EU commissioned study on wildlife trade controls (2006) found that:

“Effective public information can raise awareness of CITES and the EU Wildlife Trade Regulations and their role in protecting endangered species. Overall the long term, it may help to shape demand for CITES specimens. Several Member States have introduced innovative methods, such as in-flight videos, zoo exhibitions and school programmes; still, both here and elsewhere, officials report that further efforts are needed”. There are few simple steps that can be taken to engage the public with these issues while at the same time giving them options for changing their behaviour:

- Raise awareness of the efforts made to prevent illegal trade in corals and to monitor the legal trade to prevent it from over-exploitation – through interpretation or exhibits.
- Encourage visitors not to buy coral skeleton as curios on holiday or as tank

- decoration. Public aquariums never using dead coral skeletons as tank decoration can support the latter.
- Encourage hobbyists to seek guidance on species to avoid (e.g. Responsible Marine Aquarist (Wood and Dakin, 2003))
- Supporting and promoting The Marine Aquarium Council (MAC) (www6) raising the profile of sustainable ornamental fisheries among the general public.

In summary, while there are many threats to coral reefs that are far more damaging and acute than the ornamental trade (Kleypas and Eakin, 2007), it is perhaps the trade that we, as the public aquarium community, should best be able to control. The commercial trade can provide an incentive for continuous monitoring of wild populations of species of concern, and if managed well can generate support for sustainable coral collection at every level. Public aquariums constitute a very small part of the trade overall, and arguably produce as many corals as they consume, but they also represent a public window onto the world's reefs and a chance to influence the much bigger hobbyist market where the power of retail really has the chance to affect the long term persistence of coral populations in the wild.

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